

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A system for compression, the system comprising:
a memory device that stores a b-tree data structure comprising a plurality of compressed and uncompressed normalized index keys, each normalized index key generated by normalizing a plurality of column values that constitute an index key, the normalized index keys stored in sorted order, with no gaps between the stored normalized index keys, and stores a plurality of slots with no gaps between the stored slots, wherein the memory device stores the plurality of compressed and uncompressed normalized index keys starting after a header and the plurality of normalized index keys grows towards an end of the memory device as additional index keys are added; and,
a processor that compresses the stored normalized keys, wherein each slot corresponds to a normalized index key in the memory page and comprises a memory offset of the corresponding key and an indicator indicating if the corresponding normalized index key is compressed, wherein the processor compresses the stored normalized index keys before a memory page split.
2. (Previously Presented) The system of claim 1, wherein the memory device stores the plurality of compressed and uncompressed normalized index keys starting after the a header and the plurality of normalized index keys grows towards the end of the memory device as additional index keys are added.
3. (Cancelled)
4. (Cancelled)
5. (Original) The system of claim 1, wherein the processor compresses the stored normalized keys on the memory page by:
(a) determining if a first normalized index key in a memory device should be compressed;

(b) comparing the first normalized index key with a second normalized index key preceding the first normalized index key in the memory device;

(c) generating a common byte length between the first normalized index key and the second normalized index key consisting of the number of bytes in the common prefix between the first normalized index key and the second normalized index key;

(d) replacing the first index key in the memory page with the generated common byte length followed by the bytes from the first normalized index key that were not in the common prefix between the first normalized index key and the second normalized index key;

(e) shifting the normalized index keys following the first normalized index key to fill any empty memory space resulting from compressing the first normalized index key and updating the memory offsets contained in the slots corresponding to the shifted normalized index keys; and

(f) updating the indicator in the slot corresponding to the first normalized index key to reflect that the key is now compressed.

6. (Original) The system of claim 5, further comprising the processor repeating steps (a) – (f) for each normalized index key in the memory device.

7. (Original) The system of claim 5, wherein the processor determining if a first normalized index key should be compressed comprises:

examining an indicator in the slot corresponding to the first normalized index key to determine if the first normalized key is already compressed and not compressing a key that has already been compressed; and

determining if the first normalized index key has a preceding index key on the memory device and not compressing a key that does not have a preceding index key on a memory device.

8. (Cancelled)

9. (Currently Amended) A method for compressing a b-tree data structure, the method comprising the following steps:

storing a plurality of compressed and uncompressed normalized index keys of a b-tree data structure in sorted order in a memory page with no gaps between the stored normalized keys, wherein each index key comprises a plurality of columns each having a column value and a column type and is normalized by normalizing each column value using a normalization function selected based on the column type and concatenating the normalized column values;

storing a plurality of slots with no gaps between the stored slots;

storing a header;

compressing the stored normalized index keys on the memory page in part by comparing each uncompressed normalized index key with at least one other normalized index key to identify a common prefix; and,

after compressing a stored normalized index key, shifting at least one other stored normalized index key to fill an empty memory space resulting from compressing the stored normalized index key, wherein storing the plurality of slots comprises starting immediately at the end of the memory page and growing towards the beginning of the memory page as additional slots are added, further wherein each slot corresponds to a normalized index key in the memory page and comprises of a memory offset of the corresponding key and an indicator indicating if the corresponding normalized index key is compressed,

wherein compressing the stored normalized index keys is performed before a memory page split.

10. (Original) The method of claim 9, wherein storing the plurality of compressed and uncompressed normalized index keys comprises starting following the header with the plurality of normalized index keys growing towards the end of the memory page as additional index keys are added.

11. (Cancelled)

12. (Cancelled)

13. (Original) The method of claim 9, wherein compressing the stored normalized keys on the memory page comprises:

- (a) determining if a first normalized index key in a memory page should be compressed;
- (b) comparing the first normalized index key with a second normalized index key preceding the first normalized index key in the memory page;
- (c) generating a common byte length between the first normalized index key and the second normalized index key comprising the number of bytes in the common prefix between the first normalized index key and the second normalized index key;
- (d) replacing the first index key in the memory page with the generated common byte length followed by the bytes from the first normalized index key that were not in the common prefix between the first normalized index key and the second normalized index key;
- (e) shifting the normalized index keys following the first normalized index key to fill any empty memory space resulting from compressing the first normalized index key and updating the memory offsets contained in the slots corresponding to the shifted normalized index keys; and
- (f) updating the indicator in the slot corresponding to the first normalized index key to reflect that the key is now compressed.

14. (Original) The method of claim 13, further comprising repeating steps (a) – (f) for each normalized index key in the memory page.

15. (Original) The method of claim 13, wherein the determining if a first normalized index key should be compressed comprises:

examining an indicator in the slot corresponding to the first normalized index key to determine if the first normalized key is already compressed and not compressing a key that has already been compressed; and

determining if the first normalized index key has a preceding index key on the memory page and not compressing a key that does not have a preceding index key on a memory page.

16. (Cancelled)

17. (Currently Amended) A method for compressing normalized index keys in a b-tree data structure, the method comprising the following steps:

(a) determining if a first normalized index key in a memory page of a b-tree data structure should be compressed, wherein the first normalized index key is generated by normalizing a plurality of first column values that constitute a first index key and concatenating the normalized first column values, wherein determining if a first normalized index key should be compressed comprises:

examining an indicator in the slot corresponding to the first normalized index key to determine if the first normalized key is already compressed and not compressing a key that has already been compressed; and

determining if the first normalized index key has a preceding index key on the memory page and not compressing a key that does not have a preceding index key on a memory page;

(b) comparing the first normalized index key with a second normalized index key preceding the first normalized index key in the memory page, wherein the second normalized index key is generated by normalizing a plurality of second column values that constitute a second index key and concatenating the normalized second column values;

(c) generating a common byte length between the first normalized index key and the second normalized index key comprising the number of bytes in the common prefix between the first normalized index key and the second normalized index key;

(d) replacing the first index key in the memory page with the generated common byte length followed by the bytes from the first normalized index key that were not in the common prefix between the first normalized index key and the second normalized index key;

(e) shifting the normalized index keys following the first normalized index key to fill any empty memory space resulting from compressing the first normalized index key and updating the memory offsets contained in the slots corresponding to the shifted normalized index keys; and

(f) updating the indicator in the slot corresponding to the first normalized index key to reflect that the key is now compressed.

18. (Original) The method of claim 17, further comprising repeating steps (a) – (f) for each normalized index key in the memory page.

19-23. (Cancelled)